

REMARKS

Claims 1, 12 and 21-27 are pending. Claims 2-11 and 13-21 have been cancelled. Claim 1 has been amended and new Claims 22-27 have been added. Support for the amendments can be found throughout the specification, such as, e.g., Example 1. Support for the new claims can be found in, e.g., the originally filed claims. No new matter is added. Favorable consideration of the currently pending claims is respectfully requested in light of the foregoing amendments and following remarks.

Interview Summary

Applicants appreciate the opportunity to discuss this application during the telephonic interview conducted with Examiner Padgett on April 10, 2008, and agree with the comments provided by the Examiner in the Interview Summary paper mailed April 11, 2008.

Rejections Under 35 U.S.C. §103:

In the Office Action, the Examiner rejected the then-pending claims under 35 U.S.C. § 103(a) as unpatentable over Connell *et al.* (UK 1,037,144) (“Connell”) in view of Timmons *et al.* (5,876,753) (“Timmons”) or vice versa. In addition, the Examiner rejected the claims under 35 U.S.C. § 103(a) as unpatentable over Timmons in view of Kolluri *et al.* (5,723,219) (“Kolluri”), and Timmons in view of Chabreck *et al.* (WO 98/28026) (“Chabreck”). Applicants respectfully submit that the amendments to the claims and the below arguments overcome the Examiner’s rejection.

The Amended Claims:

Applicants note that Claim 1 has been amended to specifically recite the use of glycidyl methacrylate (“GMA”). Applicants note that of the prior art that has been relied on by the Examiner none shows the production of coatings by pulsed plasma deposition using GMA as the monomeric feedstock. Although Kolluri does refer to GMA, it does not

exemplify its use. In Chabreck deposition of GMA is limited to a continuous plasma process. Timmons does not refer to GMA at all.

The Timmons and Connell References:

Considering the Examiner's arguments in more detail and referring first to section 3 of the Office Action (beginning on p. 2), applicants submit that given that the methodologies and objectives of Timmons and Connell are so disparate the combination of these references can only be based on hindsight. Connell is not concerned with the laying down of functionalized coatings and hence has no apparent relationship with Timmons. Further, Connell does not use a pulsed plasma deposition process. Additionally, applicants traverse the Examiner's suggestion that it would be obvious to vary Timmons to include the use of GMA, since Timmons fails to disclose the use of GMA, in which light its use deriving from prior art which is directed to an entirely different purpose cannot be said to be at all obvious.

In section 3 of the Office Action, the Examiner argues that Timmons teaches plasma polymerization of monomers using continuous or pulsed plasma at low energies so as to retain active functional groups in the coating laid down by the polymerization. The Examiner asserts that "[i]t would have been further obvious . . . to determine desirable ranges of pulsed plasma parameters for the polymerization reaction for specific monomers via routine experimentation to provide an effective low power plasma as taught by Timmons." Applicants submit two basic arguments against this line of reasoning. First, data from Timmons itself indicates that the claimed method is qualitatively different from that of Timmons. Second, the comparative data in applicants' specification evidences the differences between these methods. These arguments are discussed below, in turn:

Timmons recognizes the qualitative difference between the Timmons process and the claimed process:

First, Timmons provides (at the top of Column 8) a formula for calculating the average power applied in the process. Applicants concede that the method of Claim 1 relates to average power density—nevertheless, as described below the results obtained by comparing average powers is nonetheless striking in the differences that are demonstrated. The formula of Timmons gives the average power as being the sum of the ON/OFF ratio and the peak power. Timmons' quoted minimum duty cycle ratio is 3:60 (3 ms on/60 ms off) (see, e.g., col. 6, lines 38-45) and peak power is 200 W (col. 8, lines 9-10). Using Timmons' formula and these figures, the lowest calculated average power is about 10W. Timmons mentions the application of higher average powers (such as 33W (col. 8, line 11)) and recognizes that for one group (-COCl), average power should be less than 5W (col. 8, lines 20-25).

In marked contrast, measured in the same way, the applicants' process (ON/OFF ratio 20:20,000 and peak power of 40W) provides an average power of 0.04W. This difference of at least two orders of magnitude between the power conditions operative in the present invention as compared to those in the Timmons' reference provides evidence that the respective methods are in fact significantly different in character, and that applicants' plasma deposition process operates at much lower powers than have been previously used. Applicants thus submit that the "desirable ranges of pulsed plasma parameters for the polymerization reaction" that are disclosed by applicants are neither disclosed nor suggested by Timmons and would not be achieved in Timmons by routine experimentation since the ranges are well beyond those described by Timmons.

In summary on this point, the derivation of applicants' claimed process conditions can be said to be routine only once it has been realized at the outset that one should utilize an average power density of less than $0.0025\text{W}/\text{cm}^3$, as presently claimed. Selection of the actual working conditions can then be made according to custom in order to

fit this overall requirement. This claimed average power density of less than $0.0025\text{W}/\text{cm}^3$ is not disclosed or suggested in any of the prior art references, and it is clear that neither Timmons nor any of the other prior art recognized this.

Applicants' comparative data demonstrates the differences between the Timmons process and the claimed process:

The Examiner's argument that Timmons teaches that the use of low powers is desirable for retained functionalization of coatings obtained by a plasma polymerization process appears to be contradicted by the results obtained for some epoxy-containing compounds other than GMA (i.e., allyl glycidyl ether and butadiene monoxide) which were subjected to the process of the presently claimed invention. These results appear in Examples 4 and 5 in applicants' patent specification and show that poor retention of function results from deposition under the very low power conditions of the present invention with compounds which were successfully used in Timmons—materials which demonstrated a presumably satisfactory degree of retention of functionalization when used in that method.

This comparative data shows that applicant's process is particularly suited to the treatment of GMA and that, correspondingly, GMA may not have responded well to treatment under Timmons' different conditions—this could explain why Timmons does not describe GMA as a feedstock monomer. The data illustrates that straightforward extrapolation from the Timmons plasma polymerization conditions to the presently claimed lower powers does not necessarily lead to unexpected results and thus demonstrates the novel and nonobvious nature of applicants' claimed invention.

In view of these differences, applicants submit that the respective methods of applicants and Timmons must be essentially different and that unexpected and surprising results are achieved by utilizing the claimed method with GMA.

The Kolluri and Chabreck References:

As discussed above, the Timmons reference does not disclose the use of the same species of compound as that of the claimed invention. The Examiner asserts that it would be obvious in the light of other references showing plasma deposition of GMA to apply the Timmons method to GMA. Even if this were true—which applicants deny for the reasons discussed above—applicants believe the argument to be in any event irrelevant in light of the demonstrated fact that the Timmons method is a substantially different process than the claimed method.

Moreover, it is evident that the same degree of applied power as is found in Timmons is also common to other prior art methods. For example, in section 5 (beginning p. 8) of the Office Action the Examiner discusses the combination of Timmons with Kolluri. Kolluri is concerned with functionalization of surfaces and uses various classes of monomers, including epoxy-containing compounds. However, like the Timmons process, Kolluri uses much higher power inputs as compared to the claimed process. In Kolluri the peak power used is 100W and the pulsing ratio (ON/OFF times) is 1:10 giving an average power of 10W, which is comparable with the average power data for the Timmons' method as described above. (Kolluri, Example 1, col. 22, lines 26-34).

With regard to the combination of Timmons with Chabreck which the Examiner discusses in section 6 (beginning p. 9), given the clear omission of GMA from the compounds treatable by the Timmons' method, applicants submit that it is contrary to argue that the use of GMA in Timmons is obvious due to its mention in Chabreck. Because Chabreck only polymerizes GMA by a continuous rather than a pulsed process (as in the case of Connell) it cannot properly be read in conjunction with Timmons to render obvious the use of GMA in the Timmons process. In any event, even if it would be obvious to apply the use of GMA in Chabreck to Timmons, the fact that the Timmons process is actually a substantially different process from that which is claimed renders the point irrelevant.

In view of the above, applicants submit that Claim 1, as amended, is patentable over the cited references. Applicants thus respectfully request that the rejections of Claim 1 be withdrawn.

Claims 12 and 21-27 are dependent on Claim 1 and incorporate all of its limitations. As applicants believe that Claim 1 is allowable, Claims 12 and 21-27 are also believed to be allowable.

CONCLUSION

Based upon the amendments and remarks provided above, applicants believe that Claims 1, 12 and 21-27 are in condition for allowance. A Notice of Allowance is therefore respectfully solicited.

No additional fees are believed due; however, the Commissioner is hereby authorized to charge any additional fees that may be required, or credit any overpayment, to Deposit Account No. 11-0855.

If the Examiner believes any informalities remain in the application that may be corrected by Examiner's Amendment, or there are any other issues that can be resolved by telephone interview, a telephone call to the undersigned attorney at (404) 815-6500 is respectfully solicited.

Respectfully submitted,

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